



308 Re. 3 60

The Story of a Scientist

— YELLAPRAGADA SUBBAROW



Amar Chitra Katha

No. 308, March 15, 1984

Editor

ANANT PAI

Associate Editors

KAMALA CHANDRAKANT

SUBBA RAO

Script

R. ANAND

Based on the forthcoming book

'A Scientist Named SubbaRow'

©1984 S. P. K. Gupta by S. P. K.

Gupta in collaboration with

Dr. Edgar L. Milford.

Artworks

SOUREN ROY

Art Consultant

RAM WAERKAR

Production

GOVIND KOTWANI

Published by:

H. G. MURCHANDANI

for IBH Publishers Pvt. Ltd.,

Mahalaxmi Chambers

22, Bhulabhai Desai Road,

Bombay 400 026 and printed by him

at IBH Printers, Marol Naka,

Mathuradas Vissani Road,

Andhien (East), Bombay 400 059.

©IBH Publishers Pvt. Ltd.,

Bombay 400 026.

All rights reserved 1983.

Distributors in U. S. A.

Admans Enterprises Inc.

7123 Broadway Suite 1010

New York N.Y. 10010

Subscription: (in India only)

Rs. 42/- for 12 issues and Rs. 84/-

for 24 issues. (Add Rs. 5/-

for poststation cheques).

Sole Authorised Agency for

Subscriptions: Partha Books Division,

Nay Prabhat Chambers,

Ranade Road, Dadar,

Bombay 400 028.

When you buy a
Chitra Katha
make sure it is



The Story of a Scientist

Yellapragada SubbaRow was a 'rishi' of a scientist. If he is not as wellknown in our country it is because, like the 'rishis' of yore—of whom we know little—his pursuit of knowledge was free of ego. The man who discovered Aureomycin, the man who synthesized folic acid, the man who gave us Hetrazan never pushed himself into the glare of publicity. As the director of research his name should have been at least at the top of the team. But often it took its self-effacing niche in an alphabetical order.

Neither the lowly status of an Indian in the U.S.A. of the early twentieth century nor the demands of applied research stained the scholastic integrity of SubbaRow. Such was the strength of his moral fibre—a strength which distinguished his personal as well as his professional life.

Shri S. P. K. Gupta took thirteen years to write his biography of Yellapragada SubbaRow. It is now being published by Suparna Publications, 5-17

Sriramakrishnapuram, Hyderabad, Andhra Pradesh 500 035; in two volumes.

Shri Gupta's research took him to the places and persons SubbaRow was associated with in India and the U.S.A.

Shri Gupta is now in Moscow as the special correspondent of the P.T.I.

Editor

OUR NEXT RELEASE ON

April 1, 1984

The Bridegroom's Ring

Over 300 titles
now on sale

YELLAPRAGADA SUBBAROW

VENKAMMA WAS WORRIED. SCHOOL SHOULD HAVE GOT OVER HOURS AGO, BUT HER SON, SUBBAROW AND HIS COUSIN HAD NOT YET RETURNED HOME.

THEY SHOULD HAVE BEEN BACK BY NOW.

SHE WENT OUT IN SEARCH OF THE BOYS. AT THE NEAREST CART-STAND —

TWO BOYS ABOUT THIRTEEN YEARS OLD?

YES. ONE OF THEM IS MY SON. HAVE YOU SEEN THEM?

I TOOK THEM TO THE CANAL. I'VE JUST RETURNED FROM THERE. THEY WERE WAITING FOR THE BOAT GOING NORTH.

VENKAMMA TOOK THE SAME CART TO THE CANAL.

COULD YOU PLEASE DRIVE FASTER? I SUSPECT THEY ARE RUNNING AWAY FROM HOME!

DON'T BE ANXIOUS. WE'LL BRING THEM BACK.

WHEN THEY REACHED THE CANAL —

THE BOAT HAD LEFT.
THEY'VE GONE.

DON'T WORRY. THE
BOAT COULDN'T HAVE GONE
VERY FAR. I'LL BORROW A
BICYCLE AND GO AFTER IT.



THE CARTMAN SOON CAUGHT UP WITH THE BOAT.

PLEASE HALT. I WANT
TO GET INTO THAT
BOAT.



BOATS ON THIS CANAL WERE,
AND STILL ARE, HAULED BY
MEN TRUDGING ALONG THE
BANK.

THE MEN PULLED THE BOAT TOWARDS THE
BANK AND TIED THE ROPE TO A TREE. SOON —

COME ON, BOYS. YOU'RE
GOING RIGHT BACK
HOME.

NO!



AND SUBBAROW TRIED TO JUMP INTO THE
WATER. BUT —

WE'RE NOT SWIMMING
HOME, SON. WE'RE
GETTING INTO
ANOTHER BOAT.



AFTER THE CARTMAN HAD GOT SUBBAROW AND HIS COUSIN INTO A HARASAPURAM² BOUND BOAT —

YOUR MOTHER IS DIS-
TRAUGHT WITH WORRY.
WHY DID YOU DO IT?



SUBBAROW WAS SILENT. HE DID NOT WANT TO TELL THE CARTMAN ABOUT HIS FATHER WHO WAS AILING AND POOR.



HE DID NOT WANT TO SPEAK ABOUT THE MEAGER MEAL THE FIVE CHILDREN HAD TO SHARE.



LEAST OF ALL DID HE WANT TO SPEAK ABOUT HIS GROWING RESENTMENT AGAINST HIS MOTHER.

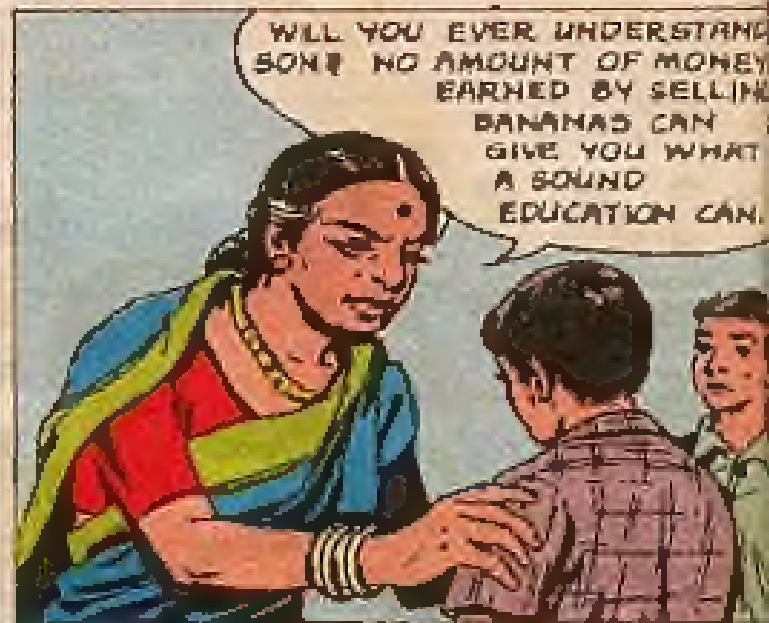


WHAT ARE YOU
DOING THERE?
GET BACK TO
YOUR BOOKS
AT ONCE.



THERE'S YOUR
MOTHER!

SOON —



SUBBAROW TRIED HARD TO CONCENTRATE ON HIS STUDIES, BUT HIS MIND WOULD KEEP WANDERING.



FINALLY WHEN HE APPEARED FOR THE MATRICULATION EXAMINATION, HE FAILED. SO HE WAS SENT FOR A SECOND ATTEMPT TO RAJAMUNDY, WHERE HIS BROTHER, PURUSHOTTAM, A SCHOOLTEACHER, LIVED.

THE ONLY SUBJECT I'M GOOD AT IS MATHEMATICS. I'LL NEVER PASS THIS EXAMINATION.

YOU WILL. DON'T LOSE HEART, SUBBAROW. THAT'S THE WORST THING YOU COULD DO TO YOURSELF.

LIFE IS FULL OF TESTS AND FAILURES. BUT THEY SHOULD ONLY GOAD YOU TO ACHIEVE WHAT YOU WANT.

PURUSHOTTAM WAS AN ACTIVE NATIONALIST. HIS HOME WAS A MEETING PLACE FOR THE FREEDOM-FIGHTERS OF THE TOWN.

SUBBAROW KEENLY FOLLOWED THE DISCUSSIONS. HIS INVOLVEMENT IN THE INTELLECTUAL FERMENT OF THE CITY LEFT HIM LITTLE TIME FOR STUDIES. AND HE FAILED AGAIN.

HE WENT TO MADRAS TO TRY A THIRD TIME TWO MONTHS BEFORE THE EXAMINATION HIS FATHER DIED AND HE RETURNED HOME. CONDITIONS AT HOME WERE AT THEIR WORST. YET —

KEEP THIS MONEY FOR YOUR FARE BACK AND YOUR EXAMINATION FEE.

BUT HOW... WHERE...?

I SOLD MY GOLD ORNAMENTS.

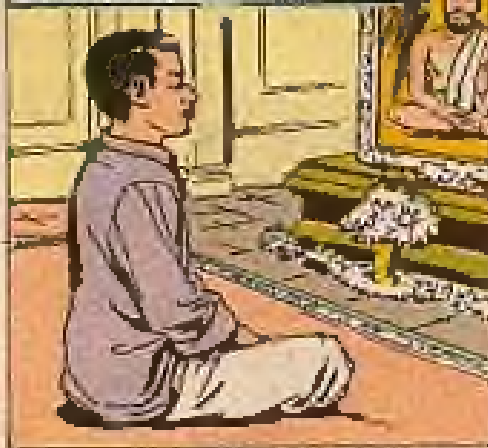
MOTHER...!

FOR THE FIRST TIME IN HIS LIFE SUBBAROW UNDERSTOOD HIS MOTHER.

THIS TIME HE PASSED THE EXAMINATION AND JOINED PRESIDENCY COLLEGE, MADRAS. IT WAS THE YEAR, 1913.



AROUND THE SAME TIME HE DEVELOPED AN INTEREST IN THE SPIRITUAL LIFE. HE STARTED VISITING THE RAMAKRISHNA MISSION.

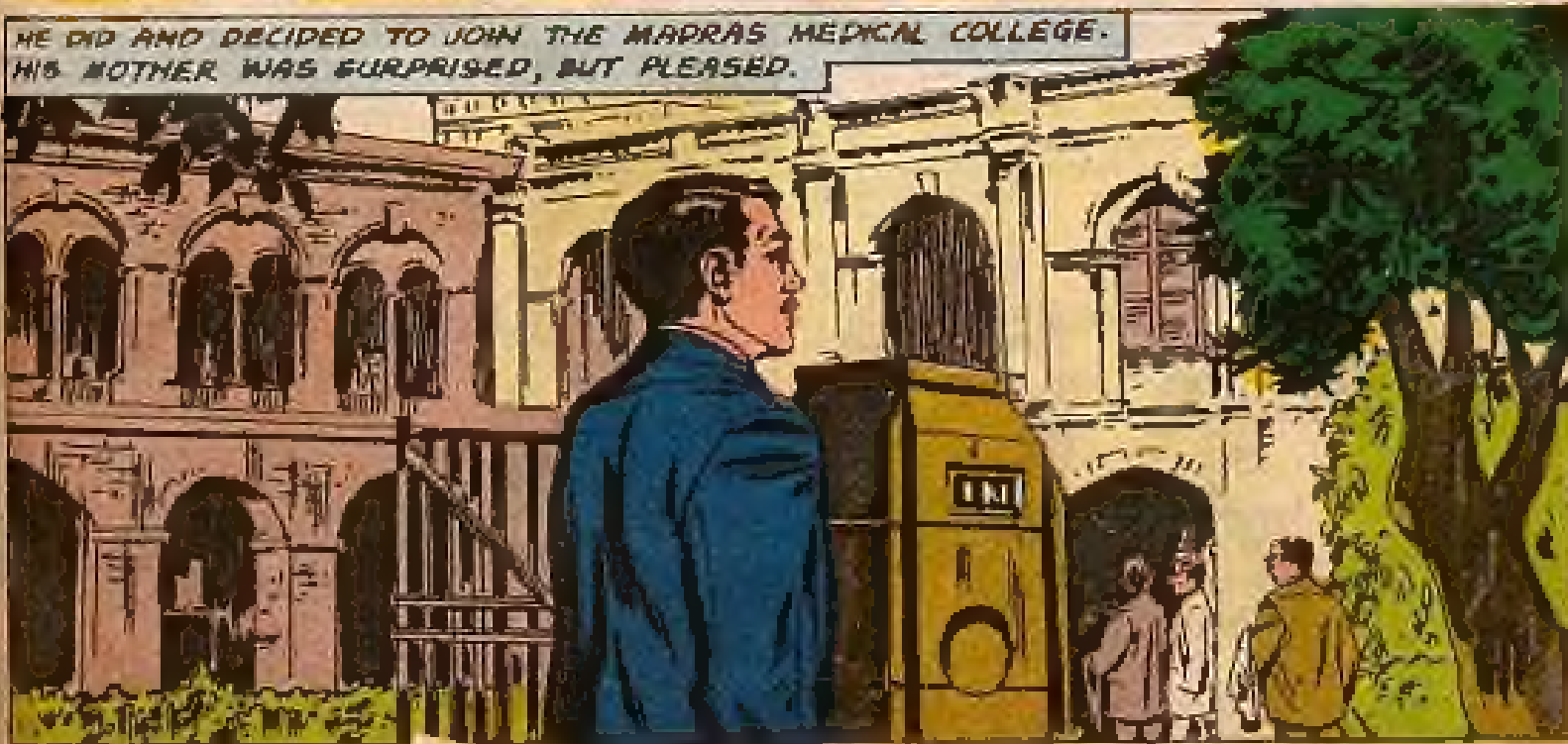


WHEN HE PASSED THE INTERMEDIATE EXAMINATION —



ON THE FOLLOWING DAY, SUBBAROW WENT TO THE RAMAKRISHNA MISSION. HE HAD MADE HIS CHOICE.





AS MONTHS PASSED BY AND HE SAW MEN AND WOMEN SUFFERING AND DYING —



SUBBAROW WAS FIRED WITH A NEW ZEAL. HE PLUNGED INTO HIS STUDIES WITH RENEWED ENTHUSIASM.



ONE VACATION WHEN HE CAME HOME —



THEY HAVE SEVERAL UNMARRIED DAUGHTERS. I WANT YOU TO MARRY ONE OF THEM.

MOTHER, IF I MARRY A RICH MAN'S DAUGHTER, I WILL BE EXPECTED TO MAKE MYSELF RICH, TOO, BY ANY MEANS!



NO MOTHER, I AM NOT INTERESTED. I DO NOT WANT TO RUN AFTER RICHES.



IT WAS ONLY HOWEVER HE WAS DRESSING
HIS MARRY SOMEONE ONE OF THE
DAUGHTERS. THE WEDDING TOOK PLACE
IN 1919



AFTER THE WEDDING, SUBBAROW RETURNED TO
COLLEGE IT WAS NOW HIS FOURTH YEAR

IN AUGUST 1920 SUBBAROW JOINED THE
NON COOPERATION MOVEMENT



SUBBAROW SUPPORTED IT BY WEARING KHADI SURGICAL GOWNS

ALL THIS STUFF IS
NOT DO YOU THINK
IT'S SOMETHING
WILL BE THE NEXT
CERONY?

NO BUT I DON'T THINK
HE WOULD CONDESCEND
TO BELONG WITH US



SUBBAROW,
DR. BRADFIELD
DIDN'T LIKE
YOUR RETORT.

HE ASKED
FOR IT



DON'T FORGET HE IS THE
PROFESSOR OF SURGERY,
FOR YOUR SAKE I HOPE
HE FORGETS THE
ACCIDENT



AT THE FINAL MEDICAL EXAMINATION SUMAN secured GOOD MARKS IN ALL PHASES EXCEPT ONE BUT HE WAS AWARDED THE LETTER AND CERTIFICATE INSTEAD OF THE HONORARY DEGREE.

AS AT WASHINGTON HE FOUND A PRATISING DOCTOR WHO WOULD DEVOTE MY TIME TO RESEARCH IN LENTHLY INVESTIGATION



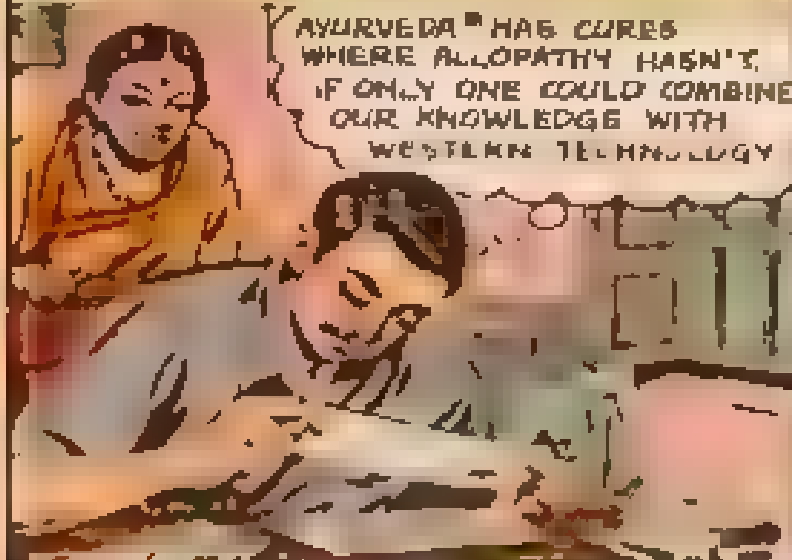
WITH HIS FIRST TWO YEARS OF MEDICAL STUDY



HE FOUND THAT THE AMERICAN PEOPLE WERE NOT INTERESTED IN HIS RESEARCH



FOR A SHORT PERIOD HE WORKED IN THE AMERICAN UNIVERSITY COLLEGE DURING THE YEARS HIS WIFE JOINED HIM



HE WANTED TO DO RESEARCH BUT HE COULD NOT FIND ANY RESEARCHERS IN THE AMERICAN AIR AND HE WAS A SOLITARY RESEARCHER



OFFER

WALKED TO
THE OFFICE
AND MET
DR. STRONG



HER CONSENT. A LOCAL TRUST OFFERED
A SMALL SCHOLARSHIP AND SUBSIDY
LEFT FOR THE U.S.A. IN 1911



HE WALKED INTO DR. STRONG'S OFFICE AT
EVENING WITH ONLY A MINUTE BEFORE
A MAN FIFTY YEARS OF AGE
WENT UP TO HIM

HE WAS THE
FIRST ONE
TO MEET



AND ALL THE TIME
HE WAS THINKING

HE WAS
A
MAN



4 THESE DAYS INDIAN DOCTORS WERE
NOT ALLOWED TO PRACTISE MEDICINE
IN AMERICA. THE ONLY JOB SUBBAROW
HAD WAS
PICKING UP URINALS AND BED-PAN



YET HE MANAGED TO FIND TIME TO STUDY AND PASSED THE REQUIRED EXAMINATION HE WAS AWARDED THE DIPLOMA IN TROPICAL MEDICINE

WHAT ARE YOUR PLANS NOW?

THERE ARE SO MANY TROPICAL DISEASES FOR WHICH NO CURE HAS YET BEEN FOUND. I INTEND TO DO RESEARCH IN THAT FIELD.

GOOD LUCK TO YOU. I AM LEAVING FOR SOUTH AMERICA ON AN EXPEDITION

THAT YEAR SUBBAROW ENROLLED HIMSELF FOR A SUMMER COURSE IN BIO-CHEMISTRY AT THE HARVARD SCHOOL OF MEDICINE AND WORKED UNDER PROF. FISKE

SUBBAROW, WE ARE TRYING TO PERFECT THE METHOD OF ANALYSING BLOOD, URINE AND TISSUE FOR PHOSPHORUS

YOUR FIRST TASK IS TO DISCOVER A FAST-WORKING CHEMICAL THAT HELPS TO ESTIMATE THE PHOSPHORUS CONTENT IN TISSUES

SUBBAROW WORKED HARD HE ENTERED HIS LABORATORY AT EIGHT IN THE MORNING AND LEFT IT ONLY WELL PAST MIDNIGHT AT LAST

I'VE FOUND THE ANSWER. THIS CHEMICAL GIVES THE DESIRED RESULT IN LESS THAN A MINUTE

BUT THAT CHEMICAL IS DIFFICULT TO PREPARE. WE NEED SOMETHING SIMPLER

FISKE WAS METICULOUS TO A FAULT, A HARD TASKMASTER AND DIFFICULT TO PLEASE. SUBBAROW WORKED DAY AND NIGHT FOR THE NEXT FOUR MONTHS AND CAME UP WITH THE RIGHT CHEMICAL.

DR FISKE, I'VE FOUND IT. THIS HAS STOOD ALL TESTS, AND IS AVAILABLE IN THE MARKET.



EXCELLENT, SUBBAROW! WE CAN NOW PUBLISH THE RESULTS.

ONE OF THE FIRST LESSONS A STUDENT OF BIO-CHEMISTRY LEARNS TODAY IS THE FISKE-SUBBAROW METHOD OF MEASURING PHOSPHORUS IN THE PREPARED TISSUE.

WHEN THE HARVARD MEDICAL SCHOOL GRADUATED, SUBBAROW WAS ACCEPTED AS A POST-GRADUATE STUDENT. ONE OF THE PROJECTS HE TOOK UP WAS ABOUT THE SOURCE OF ENERGY WHICH HELPS US MOVE OUR LIMBS, LIFT WEIGHTS AND A SO RUN.



THE FISKE-SUBBAROW INVESTIGATION LED TO THE DISCOVERY OF A SUBSTANCE IN THE HUMAN BODY CALLED PHOSPHOCREATINE.

WHEN I PUT A MUSCLE TO WORK BY ELECTRIC STIMULATION, THE PHOSPHOCREATINE LEVEL BEGINS TO FALL.



IT COMPLETELY DISAPPEARS WHEN I CUT OFF THE BLOOD SUPPLY AND DRIVE THE MUSCLE TO THE POINT OF FATIGUE BY CONTINUED ELECTRIC STIMULATION.



AND IT REAPPEARS WHEN THE MUSCLE IS ALLOWED A PERIOD OF REST!



IN OTHER WORDS
THE PRESENCE OF
PHOSPHOCREATINE
ENABLES YOU
TO WORK

AS YOU WORK
YOU LOSE IT
BUT AFTER A
PERIOD OF
REST YOU
REGAIN IT AND
ARE READY
TO WORK



COULD PHOSPHOCREATINE
BE THE SOURCE OF
ENERGY?

WE'LL HAVE
TO EXPERIMENT
FURTHER AND
SEE



HOWEVER, ONE THING IS NOW
CERTAIN. IT IS NOT
THE SOURCE OF ENERGY AS
BELIEVED BY HILL
AND
MEYERHOFF



DR. HILL OF LONDON UNIVERSITY AND PROF
MEYERHOFF OF GERMANY HAD WON THE NOBEL
PRIZE IN 1922 FOR THEIR THEORY THAT GLYCOGEN
IS THE SOURCE OF MUSCULAR ENERGY.

THEY HAD BEEN AWARDED THE PRIZE FOR THEIR THEORY OF
PHOSPHOCREATINE. THE AMERICAN MEDICAL
ASSOCIATION HAD TAKEN THE SAME VIEW
IN AN EDITORIAL

BUT DR. HILL CONTINUES
TO BELIEVE THAT
GLYCOGEN IS THE
SOURCE OF
MUSCULAR
ENERGY



WONDER
WHAT
MEYERHOFF
THINKS

MEYERHOFF HAD SEEN THE IMPORTANCE OF
THE PROBLEM AND HAD PLUNGED INTO FOLLOW UP STUDIES.

THEY HAD BEEN AWARDED THE PRIZE FOR THEIR THEORY OF
PHOSPHOCREATINE. THE AMERICAN MEDICAL
ASSOCIATION HAD TAKEN THE SAME VIEW
IN AN EDITORIAL



A FEW DAYS LATER -

S. BRADON READ THIS JOURNAL
T'S FROM GERMANY KARL
JOHANN OF MEYERHOFF'S
LABORATORY HAS
ANNOUNCED
THE DISCOVERY
OF A.P.

REALLY?

AND THIS JOURNAL WAS
PUBLISHED SIXTEEN
DAYS BEFORE OUR
ANNOUNCEMENT AT
THE CONFERENCE
THEY HAVE BEATEN
US TO IT

IT IS THE
DISCOVERY
THAT MATTERS,
NOT THE
DISCOVERER

BRADON BY NOW HAD MADE MANY
FRIENDS ONE OF THEM WAS GORDON ALLEN,
A YOUNG SCIENTIST

I'M WORKING WITH
DR. COHN ON A CURE
FOR PERNICIOUS
ANEMIA.

DON'T DAILY DOSES
OF BROILED LIVER
WORK?

DO YOU WANT TO
KNOW HOW OUR PATIENTS
REACT TO IT? COME,
I'LL SHOW YOU

AT THE WARD -

UGH! I FEEL LIKE
BRINGING UP. I CAN'T
SWALLOW IT

IT IS A MEDICINE, NOT
A DELICACY! COME ON,
OPEN YOUR MOUTH.

CAN'T YOU GIVE
ME AN INJECTION
INSTEAD?



AFTER -

ISOLATE THE
SUBSTANCE IN
LIVER THAT CURES
ANAEMLA AND THERE I
THE PATENTS HAVE
THEIR INJECTION!

THAT'S WHAT WE'VE
BEEN TRYING TO DO
BUT, NO LUCK WHY
DON'T YOU HELP
US OUT?



HE WAS EXHAUSTED WORKING.

HE WANTED TO WORK ON
THIS PROJECT THE CURE
FOR PERNICIOUS ANAEMIA
ALL ALTHOUGH HE HAD
FOR A PHYSICAL SURGEON



WE HELPED MY
BROTHER, BACK IN
INDIA

OH



PERNICIOUS ANAEMIA AND TROPICAL SPRALE
ARE SO CLOSE IN THE SYMPTOMS THAT MANY
MEN BELIEVED THEY HAD A COMMON CURE

ABRAHAM DECIDED TO DO A
SERIES OF EXPERIMENTS ON ANIMALS

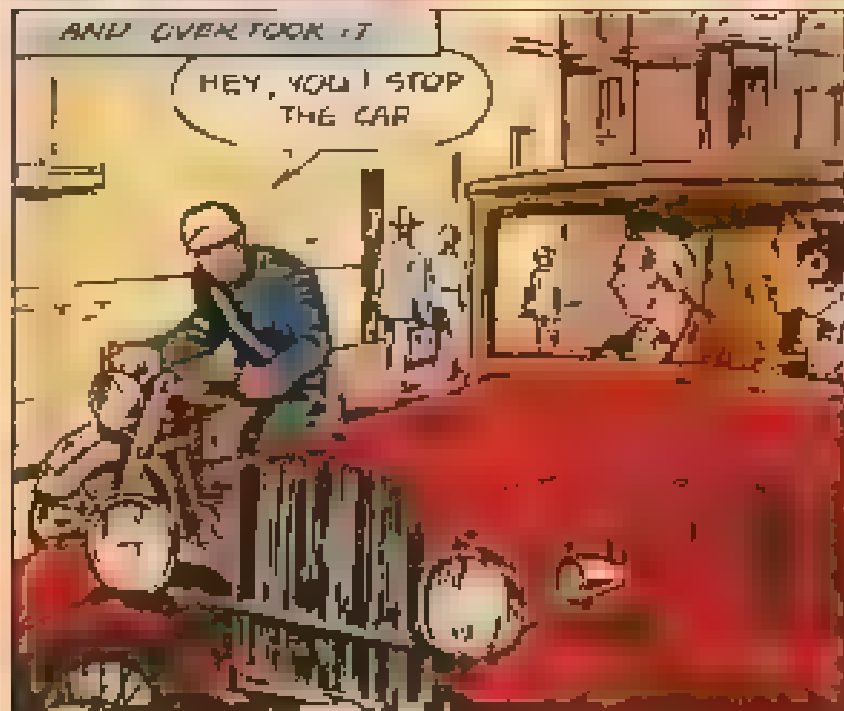
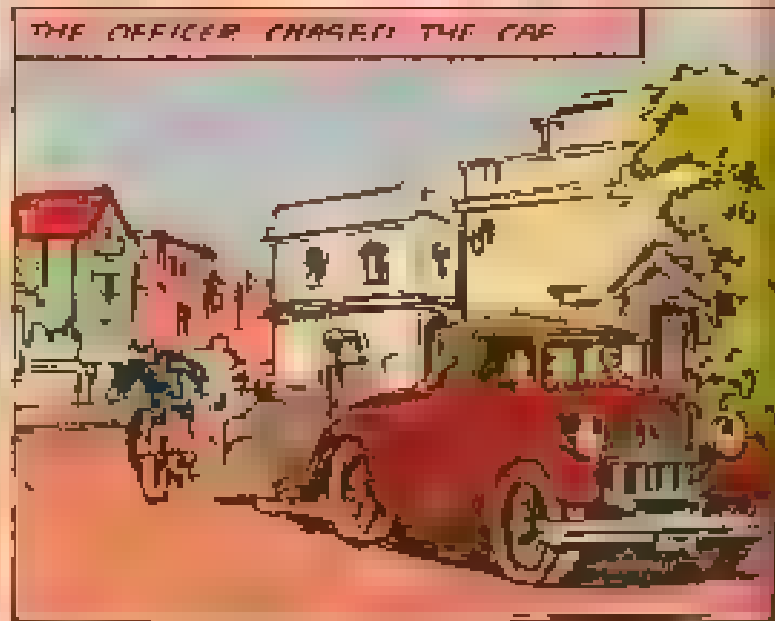
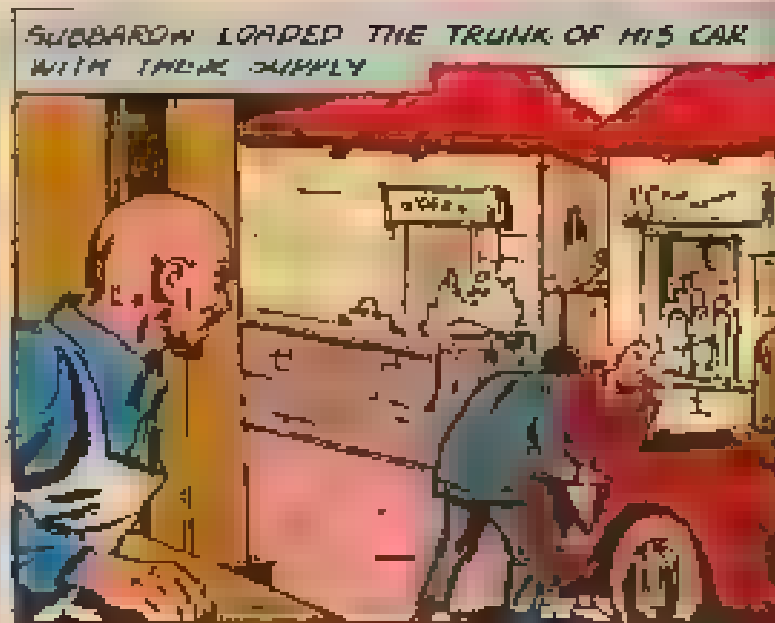
COME,
LET'S GO AND
GET SOME
LIVER



WHAT CAN I DO
FOR YOU, SIR?

WE WANT
SOME LIVER





SUBBAROW OBTAINFULLY OBEYED

WHAT! LIVER! ARE YOU SURE NOTHING IS HIDDEN IN THERE?

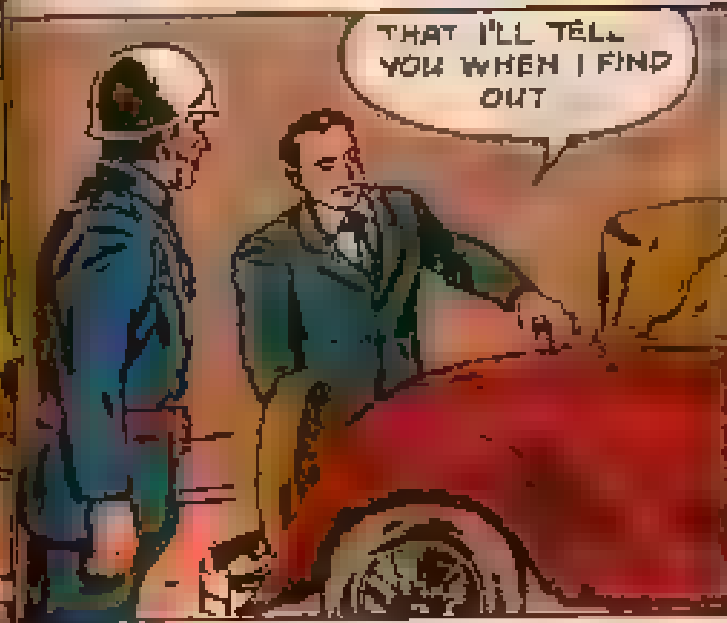


THERE IS SOMETHING HIDDEN IN THERE

WHAT IS IT?



THAT I'LL TELL YOU WHEN I FIND OUT



AND SUBBAROW AND HIS ASSISTANT DROVE AWAY LEAVING THE OFFICER PERPLENED.



SUBBAROW WORKED WITH A JUNIOR SCIENTIST, JACOBSON, ON THE PROJECT. THE PROGRESS WAS VERY SLOW BECAUSE SUBBAROW DID NOT HAVE THE NECESSARY EQUIPMENT FOR SUCH A DIFFICULT PROJECT.

JACOBSON NOW I WISH I HAD A WELL-EQUIPPED LAB WHERE I COULD WORK AS I PLEASED

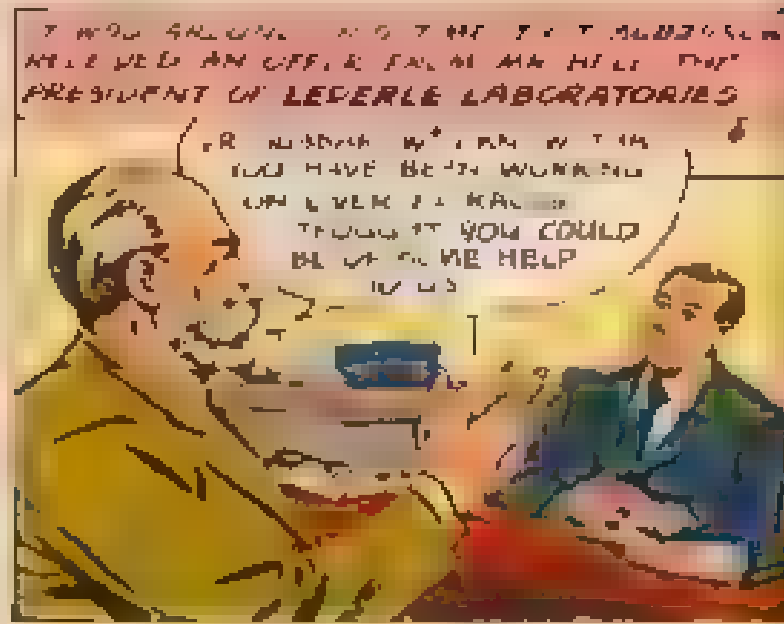
AND WITH A LIBERAL BUDGET!



AT LAST SUBBAROW AND JACOBSON CAME OUT WITH A LIVER EXTRACT WHICH COULD BE INJECTED

THANK GOD DON'T HAVE TO EAT RAW LIVER ANYMORE!





DO HAVE THE
AMOUNT PROVIDED



YOU GET A
WELL-EQUIPPED
RESEARCH
LABORATORY
WHERE I CAN
WORK AS
I WANT



IT'LL BE
DONE



I'LL ASK UP HE
TOD THE DAY T
S READY



HE LEFT HIS JOB WHEN SUBARROW LEFT
BEHIND AFTER SEVENTEEN YEARS OF
OUTSTANDING ACHIEVEMENT WORK

HERE IS THE
AB YOU
WANTED



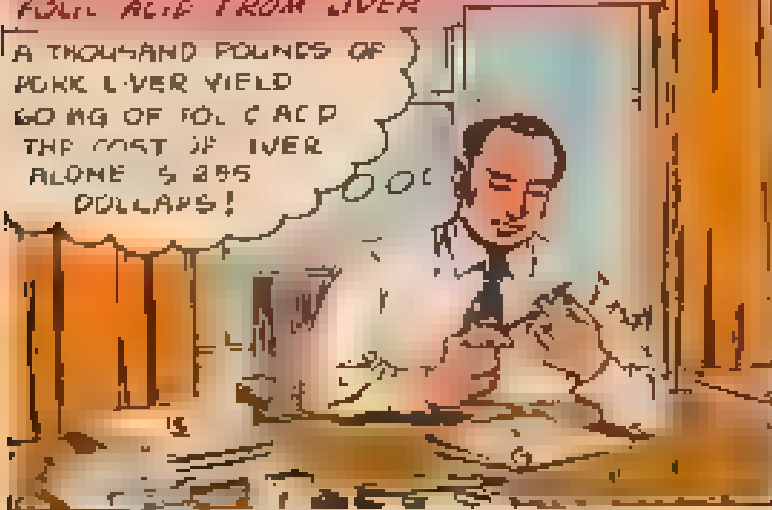
IN 1940 SUBARROW / HE / LEFT THE
LABORATORY IS HIS AN ASSOCIATE
DIRECTOR OF RESEARCH

PLEASE WHEN YOU WORK
FOR ME YOU KNOW
IT YOU WILL GET IN
REACH BUT HE / HAS
MADE THE ALL /
OF OPPORTUNITY



AMONG THE SEVERAL PROJECTS TAKEN UP BY THE SUBBAROW TEAM WAS THE EXTRACTION OF THE VITAMIN CALLED FOLIC ACID FROM LIVER

A THOUSAND POUNDS OF PORK LIVER YIELD 60 MG OF FOLIC ACID THE COST OF LIVER ALONE \$ 255 DOLLARS!



WE CANNOT AFFORD SUCH COLOSSAL EXPENDITURE IF WE COULD SYNTHESISE FOLIC ACID



ONE OF THE GROUPS SUCCEEDED IN FINDING OUT THE BASIC STRUCTURE OF FOLIC ACID

THE THREE BASIC COMPONENTS ARE FOUND SEPARATELY IN YELLOW PIGMENTS OF BUTTERFLIES, IN WHEAT AND IN YEAST

THEN SYNTHESISE THOSE THREE COMPONENTS AND PROCEED WITH THE SYNTHESIS OF FOLIC ACID



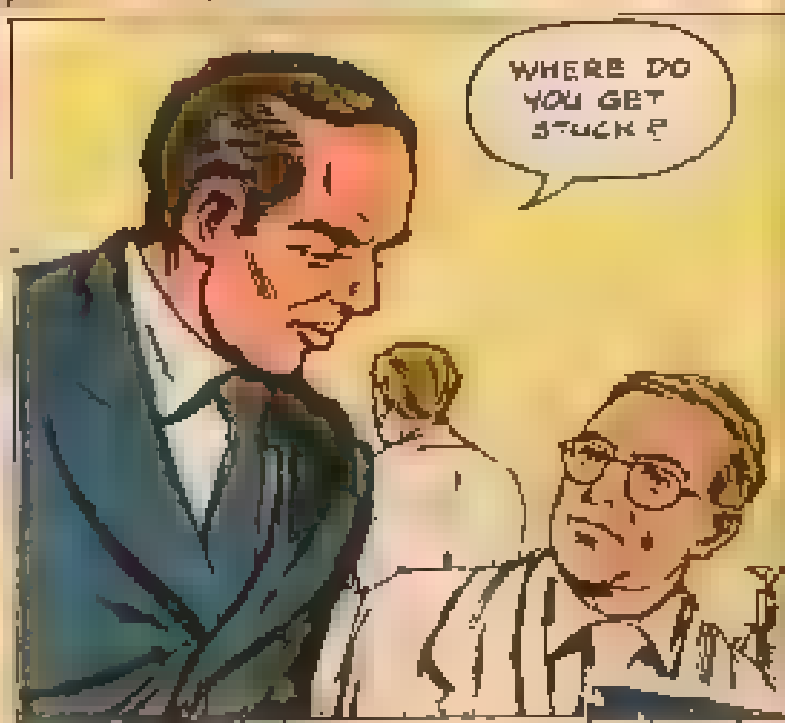
IT WAS NOT EASY TO FIND THE RIGHT COMBINATION TO GET FOLIC ACID OVER A DOZEN CHEMISTS WORKED ROUND THE CLOCK FOR A YEAR THEN ONE DAY

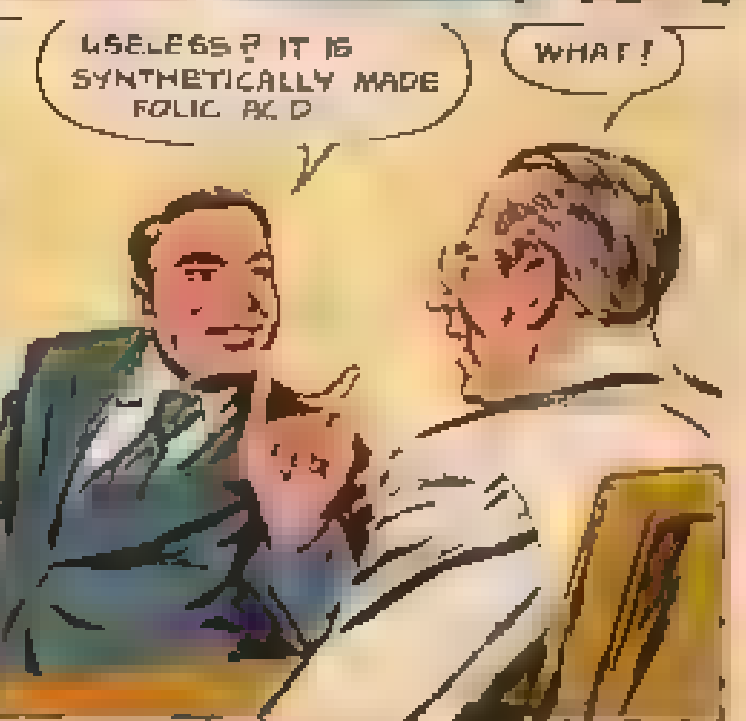
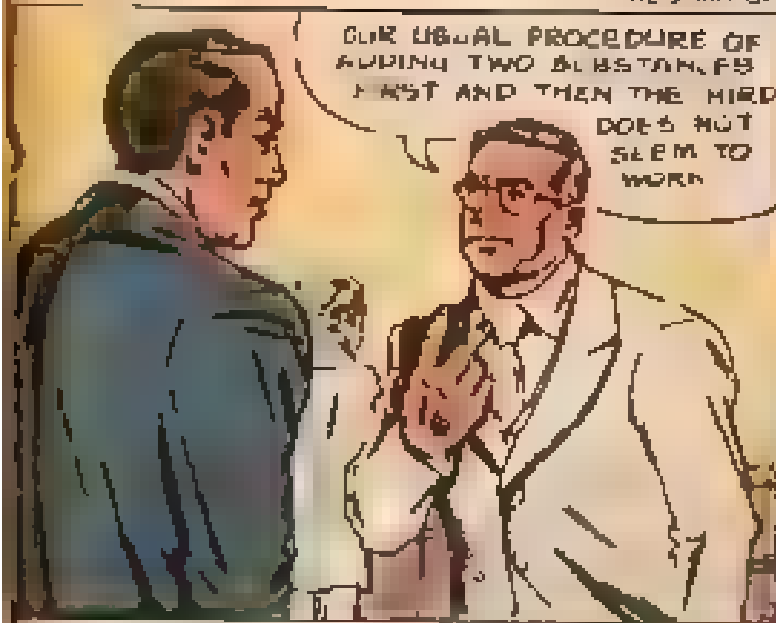
COY WALLER, ANY PROGRESS?

NO, DR SUBBAROW WE HAVE TRIED ALL COMBINATIONS BUT WITH NO RESULTS



WHERE DO YOU GET STUCK?





THE NEW MEDICINE HAD TO APPEAR IN PATIENTS SUFFERING FROM ANAEMIA AND TODAY WE HAVE ONE OF THE FIRST RESULTS RELEASED FROM THE LABS.

BAD NEWS FOLIC ACID IS OF NO USE IN TREATING PERNICIOUS ANAEMIA

OH!

BUT WHEN REPORTS FROM ANOTHER QUARTER CAME IN -

MR DARBY HAS DECLARED IT A WINNER - IT CAN DO THE WORK



SO A LAST WE HAVE THE CURE FOR SPRUE WHICH KILLED MY BROTHER!



AFTER A FEW MONTHS, THE DISCOVERY OF FOLIC ACID LED TO THE DISCOVERY OF VITAMIN B12 BY ANOTHER PHARMACEUTICAL COMPANY.

IN THE SCIENTIFIC WORLD AND EVEN IN THE FOLIC ACID SYNTHESIS, HUBBARROW CLAIMED NO SPECIAL CREDIT. HE GAVE HIS NAME AS ONE OF THE SEVEN SCIENTISTS WHO WERE AS A RULE WITH THE FOLIC

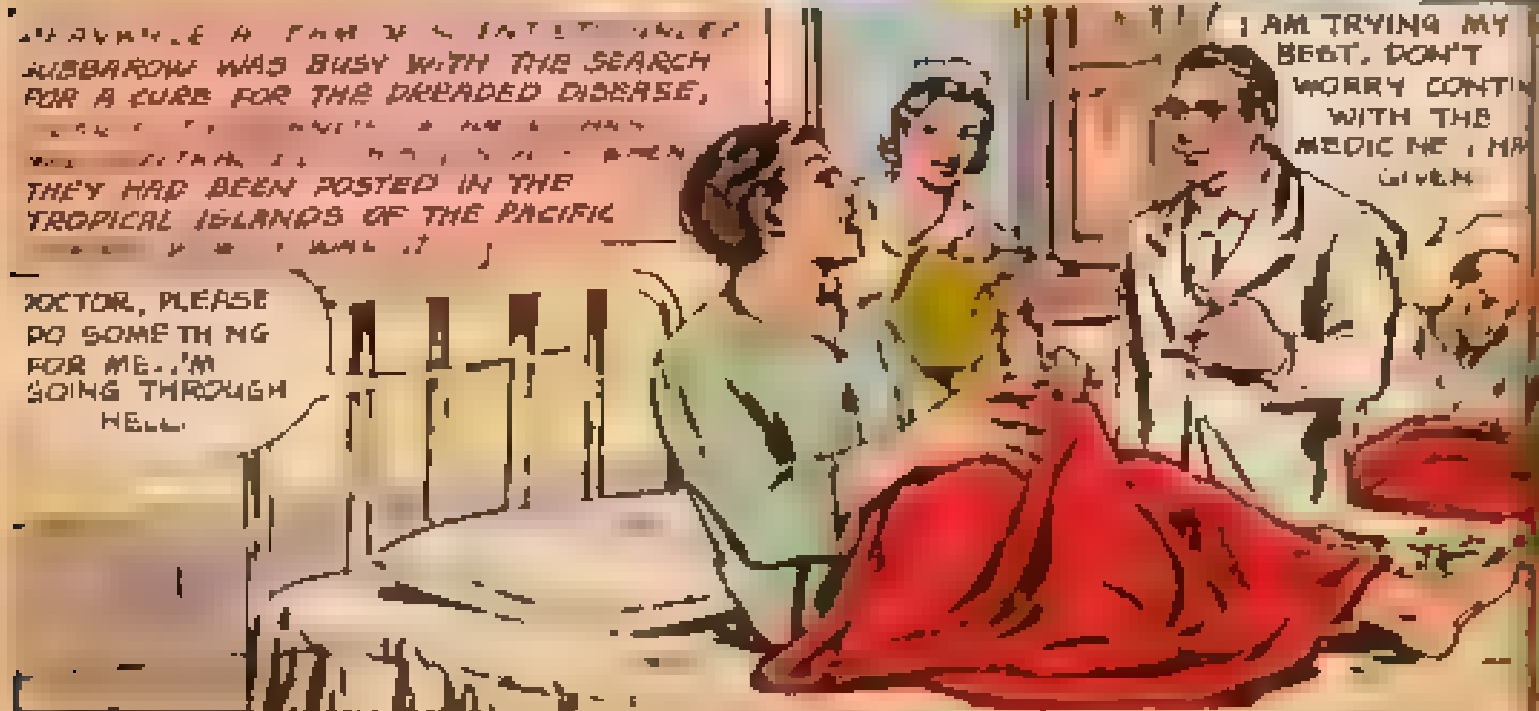
THE ALLEGMENTS OF SCIENCE ARE BUILT ON THE EFFORTS OF MANY



AT ABOUT A YEAR OR SO AFTER HUBBARROW WAS BUSY WITH THE SEARCH FOR A CURE FOR THE DREADED DISEASE, THEY HAD BEEN POSTED IN THE TROPICAL ISLANDS OF THE PACIFIC

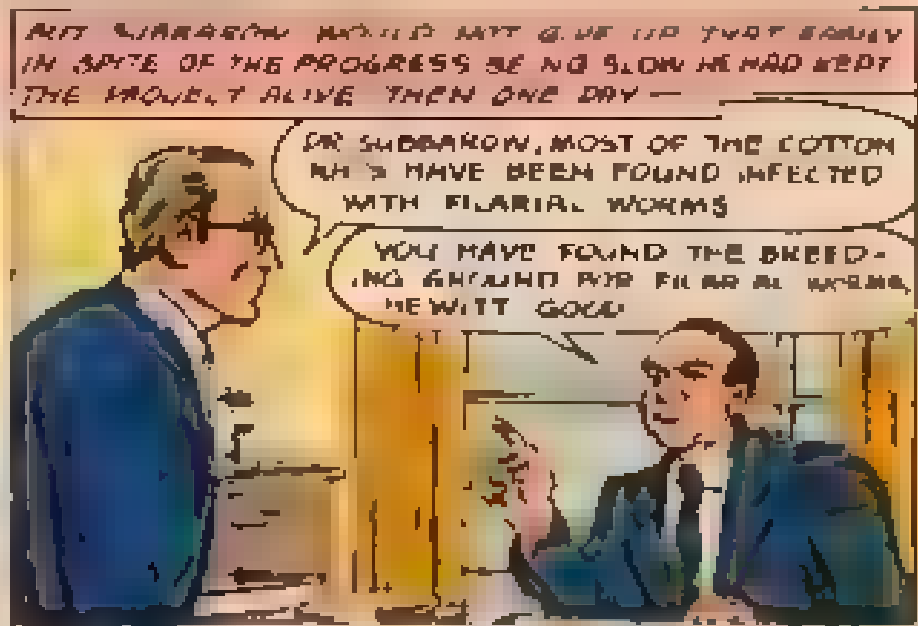
DOCTOR, PLEASE DO SOMETHING FOR ME. I'M GOING THROUGH HELL.

I AM TRYING MY BEST, DON'T WORRY CONTINUE WITH THE MEDICINE I HAVE GIVEN





MEDICINE I WONDER WHEN WE'LL EVER FIND A CURE FOR THIS DISEASE.



MY SUBBARON WON'T GIVE UP THAT EASY IN SPITE OF THE PROGRESS BEING SLOW HE HAD KEPT THE MOUSE ALIVE THEN ONE DAY —

DR SUBBARON, MOST OF THE COTTON WOLFS HAVE BEEN FOUND INFECTED WITH FILARIAL WORMS

YOU HAVE FOUND THE BREEDING GROUND FOR FILARIAL WORMS, HEWITT GOLD

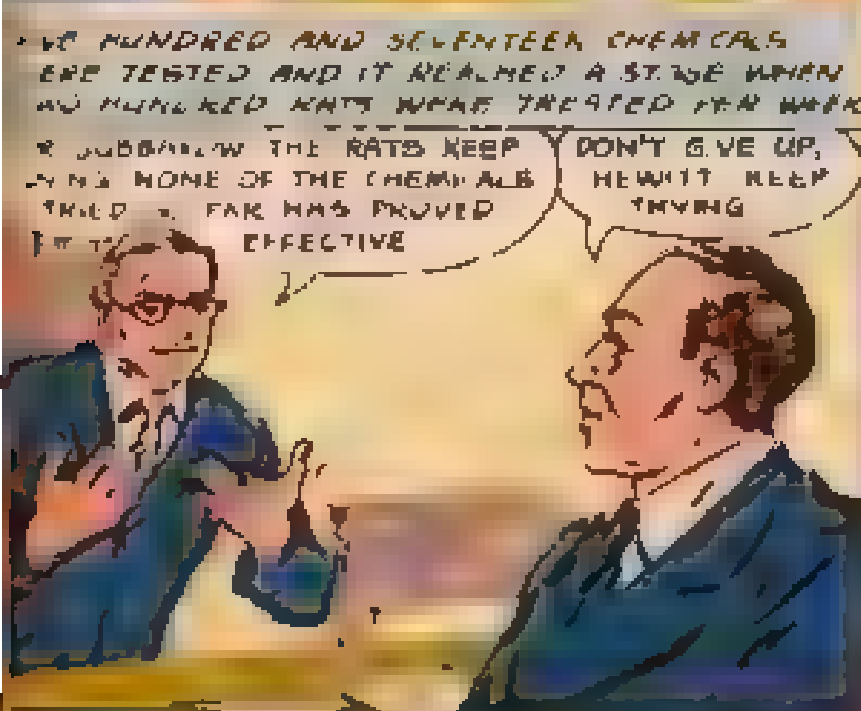


AND I HOPE YOU WILL ALSO FIND THE CHEMICAL THAT WILL DESTROY THOSE WORMS

I'LL TRY



THE INITIAL TEST BEGAN ON TWENTY RATS PER WEEK

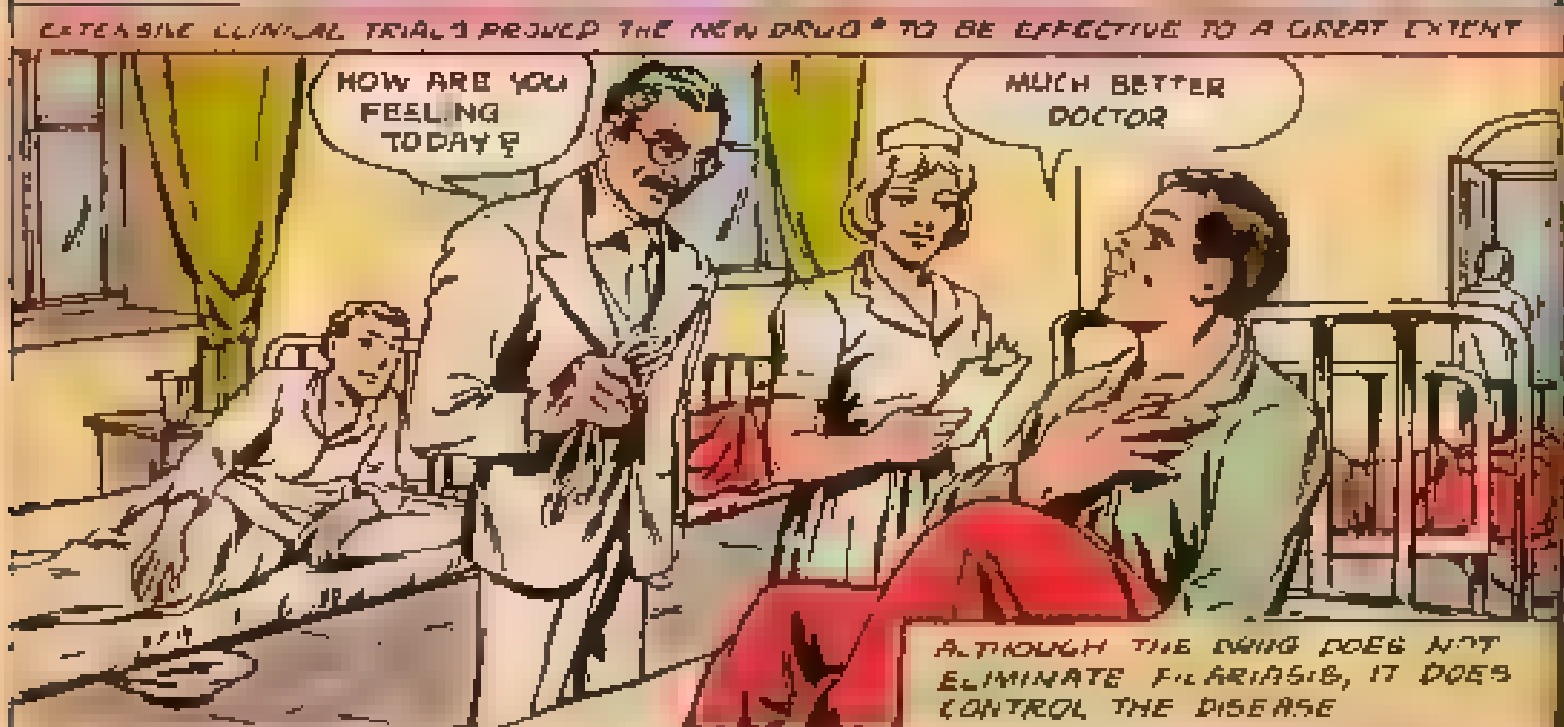
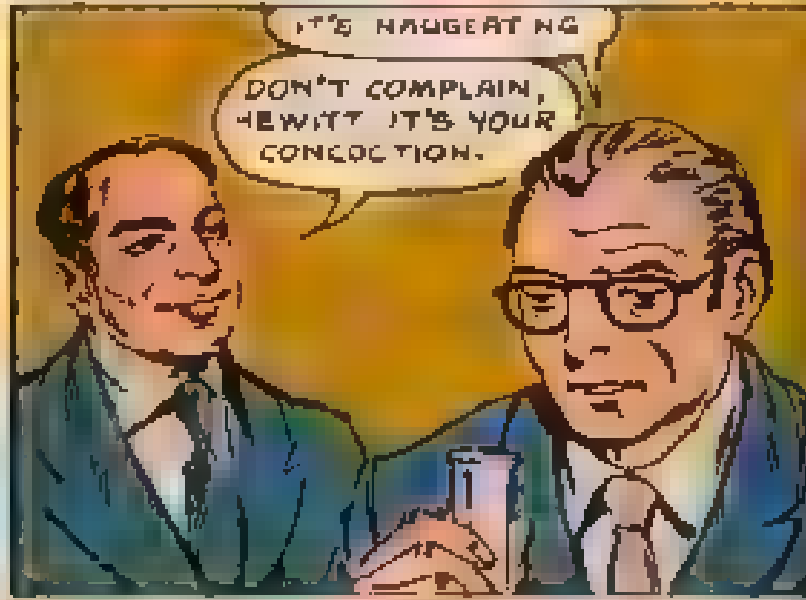


FIVE HUNDRED AND SEVENTEEN CHEMICALS WERE TESTED AND IT REACHED A STAGE WHEN TWO HUNDRED RATS WERE TREATED PER WEEK & SUBBARON THE RATS KEEP DYING & NONE OF THE CHEMICALS THIED & FAR HAS PROVED EFFECTIVE

DON'T GIVE UP, HEWITT KEEP TRYING



AND BRING ME THE RAT THAT SURVIVES



THEY WERE ALLY NAMED IN ONE SINGLE
WELL, SUBBARDON THOUGHT HIS HADEN IN TO OTHER
DISEASES

I WOULD LIKE TO HAVE A
MEDICINE WHICH IS
EFFECTIVE AGAINST
NOT JUST ONE
DISEASE BUT
SEVERAL

YOU MEAN AN ANTIBIOTIC
FOR A WIDE RANGE OF
INFECTIONS?



6. LET'S EXAMINE
ALL THE POSSIBLE
SOURCES OF
ANTIBIOTICS

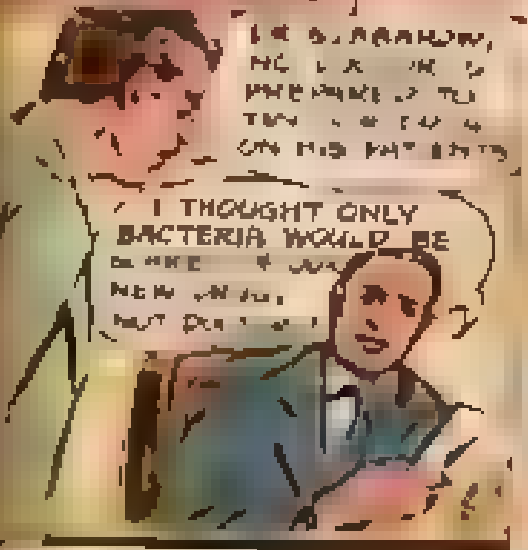


IT WAS EASIER SAID THAN DONE IT TOOK
FIVE YEARS OF HARD WORK WITH MANY
MOMENTS OF DESPAIR AND FRUSTRATION
BEFORE SUBBARDON'S TEAM CAME OUT WITH
THE ANSWER - TELLING DR. WRIGHT WHICH
SUBBARDON WAS LOOKING FOR.



AT AT MY... I THINK
HARD FOUND... BUT SEE
UP YOUR

IN LATE 1940S AT
LAW AND MY THE NEW
THE 3.5. 1940S WERE
AND 4. 1940S WERE
AND 5. 1940S WERE



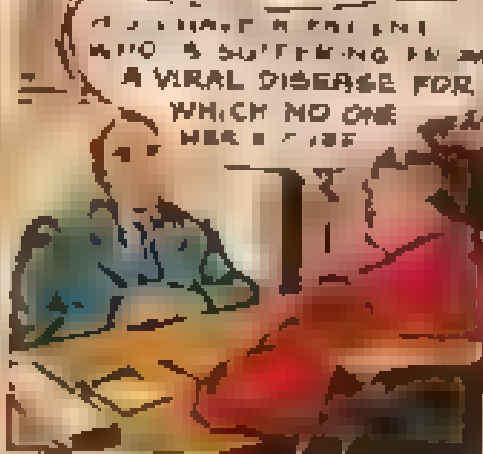
DR. SUBBARDON,
NO ONE IN THE
WORLD IS WILLING
TO TRY A NEW
ON HIS PATIENTS

I THOUGHT ONLY
BACTERIA WOULD BE
KILLED BY A
NEW DRUG
BUT NOT

THEN SUBBARDON WIFE
LAW AND MY THE NEW
THE 3.5. 1940S WERE
AND 4. 1940S WERE
AND 5. 1940S WERE

DR. WRIGHT, I'VE A
DRUG NO ONE IS WILLING
TO USE. I HAVE FAITH IN
IT. WOULD YOU GIVE IT
A TRIAL?

I HAVE A FRIEND
WHO IS SUFFERING FROM
A VIRAL DISEASE FOR
WHICH NO ONE
HERE HAS



THEY WERE ALLY NAMED IN ONE SINGLE
WELL, SUBBARDON THOUGHT HIS HADEN IN TO OTHER
DISEASES



INDEED THE NEW ANTIBIOTIC DID TURN OUT TO BE A MIRACLE DRUG.

YES, DR. WRIGHT?

MY PATIENT IS CURED. SEND SOME MORE OF YOUR NEW MEDICINE.



THE TETRACYCLINES NOW AVAILABLE ARE ALL DERIVED FROM THE ONE DEVELOPED BY SUBBARDON'S TEAM.

IN THE COURSE OF HIS RESEARCHES, SUBBARDON'S ATTENTION HAD BEEN DRAWN TO CANCER, TOO. HIS TEAM CAME OUT WITH A MEDICINE CALLED AMINOPTERIN FOR TREATING CANCER OF THE BLOOD IN CHILDREN.

LET'S ARRANGE FOR A CLINICAL TRIAL.



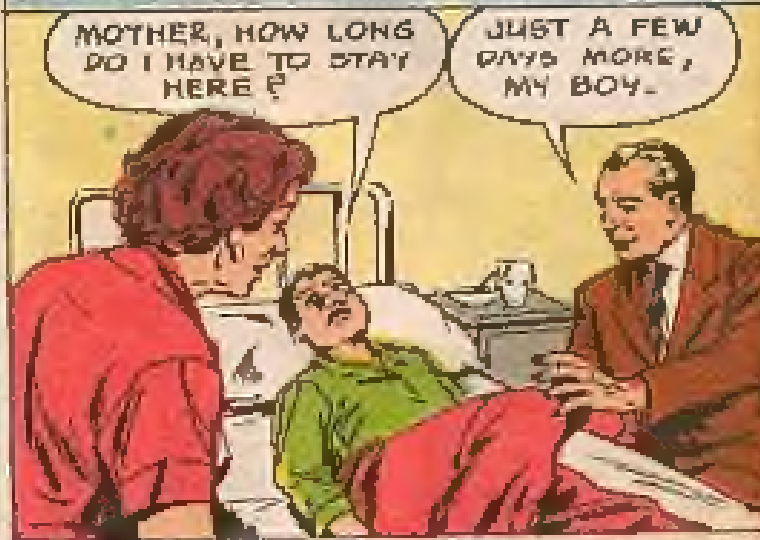
THAT SAME DAY A BOY SUFFERING FROM BLOOD CANCER WAS ADMITTED TO A BOSTON HOSPITAL.



THE BOY WAS TREATED WITH THE NEW MEDICINE AND HE STARTED IMPROVING.

MOTHER, HOW LONG DO I HAVE TO STAY HERE?

JUST A FEW DAYS MORE, MY BOY.



AT LAST THE TREATMENT WAS OVER AND THE BOY WAS DISCHARGED.

MOTHER, ARE WE GOING HOME TODAY?

YES, MY DEAR, WE CAN NOW GO HOME.



DOCTOR, HAS MY BOY BEEN CURED?



TO BE FRANK, NO, MADAM.
THE TREATMENT HAS
PROLONGED HIS LIFE
FOR A FEW MONTHS
ONLY.

OH!

CAN'T THE MAN WHO
HAS GIVEN US
SKINOPTERIN COME
OUT WITH A
PERMANENT CURE?

WHY NOT, MADAM?
GOD WILLING HE
MAY, BEFORE YOUR
CHILD HAS A
RELAPSE.

IN FACT WITHIN A FEW MONTHS SUBBAROW
AND HIS COLLEAGUES CAME OUT WITH
METHOTREXATE WHICH WAS EVEN MORE
EFFECTIVE IN TREATING NOT ONLY BLOOD
CANCER BUT ALSO OTHER TYPES OF
CANCER AS WELL.

DR. SUBBAROW,
WHAT ARE YOUR
FUTURE PLANS?

I WOULD LIKE TO BUILD
AN INDEPENDENT CANCER
RESEARCH UNIT,
MR. BELL...

...IF YOU
SANCTION IT.

GO AHEAD,
DR. SUBBAROW.
I'LL BACK YOU
ALL THE WAY.

SUBBAROW FINALISED THE PLANS FOR THE CANCER RESEARCH UNIT.
HOWEVER, HE DID NOT LIVE TO SEE IT ESTABLISHED. HE DIED OF
HEART FAILURE AT THE AGE OF FIFTY-THREE.



